DOCUMENT RESUME

ED 412 949 IR 056 593

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TITLE Meeting Drug Information Needs of Adolescents.
PUB DATE 1997-00-00
NOTE 13p.; In: Information Rich but Knowledge Poor? Emerging Issues for Schools and Libraries Worldwide. Research and Professional Papers Presented at the Annual Conference of the International Association of School Librarianship Held in Conjunction with the Association for Teacher-Librarianship in Canada (26th, Vancouver, British Columbia, Canada, July 6-11, 1997); see IR 056 586.
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Adolescents; Adoption (Ideas); *Cognitive Processes; *Drug Education; Drug Use; Foreign Countries; Health Education; High School Students; High Schools; Information Literacy; Information Seeking; *Information Utilization; Librarians; *Library Role; Prevention; *School Libraries; Teacher Role; User Needs (Information)
IDENTIFIERS Australia (Sydney)

ABSTRACT

Drugs are an important life concern of adolescents, yet statistics show alarming and disturbing increases internationally in drug abuse. This paper reports on research that examines how adolescents cognitively process information about drugs. Four 17-year-old girls at a Catholic college in Sydney, Australia participated in a two-phase experiment involving the baseline measures of the girls' knowledge and the introduction of staged exposures to information. The paper explores why they chose and rejected certain information, and how they put it to use. The findings have important implications for the role of school libraries in the provision of drug information, the teaching and learning process, information literacy education, as well as for the role of teachers and teacher-librarians in shaping the knowledge and attitudes of adolescents toward a drug-free lifestyle. Adolescents are selective and constructive in their use of information, and their information needs and goals vary. Enhancing their access to drug information through a tailored collection, improved database access, more effective instructional design, and quality dialogue may well mean a greater quality of life for these adolescents, if not a question of life and death. (Contains 21 references.) (SWC)

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ED 412 949

MEETING DRUG INFORMATION NEEDS OF ADOLESCENTS

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ABSTRACT

Drugs are an important life concern of adolescents, yet statistics show alarming and disturbing increases internationally in drug abuse. This paper reports on research that examines how adolescents cognitively process information about drugs. It explores why they chose and rejected information, and how they put it to use. The findings have important implications for the role of school libraries in the provision of drug information, the teaching and learning process, information literacy education, as well as for the role of teachers and teacher-librarians in shaping the knowledge and attitudes of adolescents toward a drug-free lifestyle.

INTRODUCTION

Adolescence is acknowledged as a period of transition: a time of transformation of close relationships with parents and family members, and the challenge of new relationships with friends and peers; a time of learning to negotiate new social support networks, and a time of accelerated independence, developing self-concept and establishing boundaries for acceptable behavior. During this time, patterns of attitudes, values and behaviors undergo considerable transformation. Conformity and the need to belong are strong, driven by a sense of personal integration and coherence, as well as pressures of peer group formation and influence (Drummond, 1991; McDonald & Towberman, 1993).

Considerable research exists about adolescent drug abuse and its consequences, as well as the complex interaction of biological, social, and psychological variables shaping its use. It is known that adolescence is when the first experience with drugs usually occurs, and when experimenting with drugs is often most active. It has been found that associating with drug-using friends is a strong predictor of drug use. Adolescents who used specific drugs in the last 30 days almost invariably had friends who also used these drugs (Dinges & Oetting, 1993). In addition, there is evidence to suggest that frequency of parental substance use is positively related to adolescent substance use (Anderson & Henry, 1994).

The statistics of adolescent drug use are sobering. thirty-seven percent of the total US population aged 12 and older have used marijuana, cocaine or other illicit drugs at some times in their lives. Current usage patterns among adolescents aged 12—17 show that they are polydrug users (Wodarski, 1991, p. 668). According to the Monitoring the Future Survey on Drug Abuse, undertaken by the National Institute on Drug Abuse (NIDA),48.4% of all American high school seniors have used illegal drugs; 41% of 10th graders have used drugs at some point, and 28.5% of 8th graders have tried one or more drugs. More than 21% of seniors, 17.2% of 10th graders and 9.1% of 8th graders are current users of marijuana. The use of cocaine amongst 8th and 10th graders increased between 1994 and 1995; and crack cocaine use increased among 8th and 10th graders between 1992 and 1995. Overall, the use of illegal drugs by adolescents increased significantly between 1992 and 1995, representing a reversal of downward trends observed for several years. The scenario in Australia is no better. Statistics from the New South Wales Health Department Drug and Alcohol Directorate (1993) show that in the 15—34 age group, 51% of drug caused deaths were due to alcohol, and 33% were opiate caused deaths.

Equally disturbing are emerging trends in adolescents' attitudes and perceptions about drug use. In 1995, continuing a downward trend, significantly fewer adolescents felt that there was great risk of people

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harming themselves when they use marijuana, crack, or powdered cocaine. These students also acknowledged that it is "very easy" or "fairly easy" for them to get these drugs (National Institute on Drug Abuse [NIDA], 1995). At the same time, there is evidence indicating that drugs are an important life concern for adolescents. Poston-Anderson and Edwards (1993) studied girls aged 13 and 14 to identify their life concerns, defined as "any problems, concerns or worries they had in the last month." (p. 26) The study showed that concerns revolved around relationships with peers, parents and family, concerns about drugs and their friends, and concerns about education and work, including choosing a career, schoolwork and final exams.

Given that adolescents spend the majority of their lives in school, a school is an important place for the provision of drug information to shape their values, attitudes and practices towards a drug-free lifestyle, and a vital forum for implementing change. This is acknowledged by the presence of drug information in school curricula across the world. Here adolescents learn basic knowledge about drugs and their consumption and usage, approach to self-management and maintenance, laws and enforcement, as well as the broader context of coping with living, problem solving and decision making. The school library also has an important role to play in successfully designing information services and programs for this significant social problem, particularly programs that are integrated into the larger pattern of students' lives. Poston-Anderson and Edwards's study (1993) however showed that more than half of the girls did not see the school library as being helpful in meeting their life concerns, especially those related to relationships, including drugs.

Why does this drug problem continue, despite the extensive range of drug information programs and services for adolescents? Researchers know little about the effective prevention of drug abuse among adolescents. What happens in the minds of adolescents when they are provided with this plethora of drug information? Other issues that have to be addressed have to do with the type of interventions, their subsequent foci, and how interventions affect groups of adolescents differentiated by gender, culture and age.

AIMS AND CONCEPTUAL BACKGROUND

This research sought to explore how adolescents cognitively interact with drug information that they are exposed to in the course of their daily lives. Specifically it sought to understand how adolescents' existing knowledge about the drug heroin was modified by exposures to information about this drug, what shaped this interaction, and what were the cognitive effects of this modification. Based on this, the research also identifies some implications for teacher-librarians and teachers in the provision of drug information.

The conceptual framework for this study is derived from cognitive information processing, and specifically the work of Bertram Brookes. Brookes was Reader in Information Science at the University College of London School of Librarianship and Archives from 1966—1977. He believed that understanding the interaction between the private, inaccessible thoughts and mental images of people and the public recorded knowledge was fundamental to providing appropriate information services designed to meet the needs of people. Brookes explicated this notion of cognitive interactions as an abstract equation which he expressed as K[S]+ DI = K[S + DS] (Brookes, 1980, p. 131). By this equation, Brookes was simply stating that in the process of doing something with information, a person's existing knowledge structure K[S] was changed by an increment of information DI, and this modification had some effect, a changed knowledge structure K[S + DS] where DS indicated the effect of the modification. He saw the equation as an interactive process of what people already know, how what they know changes through selectively taking in information, and the effect of these changes.

Brookes argued that people's internal private knowledge was the coherent summation, integration and transformation of many bits of information selectively chosen, absorbed and ordered from stimuli encountered in daily life. He saw people's knowledge as a "structure of concepts linked by their relations," (Brookes, 1980, p. 131) and postulated that as a result of exposure to information, these knowledge structures could be modified, and that these modifications resulted in a range of cognitive effects. Central to this process is the widely held assumption that information makes a difference to what people already know, that it has some effect.

The role of existing knowledge has long been recognized in educational theory and practice. Ausubel's assimilation theory of cognitive learning (Ausubel, 1963) asserts that new knowledge and meaningful learning result when people consciously tie new knowledge to relevant concepts already a part of their existing knowledge. Existing knowledge provides an anchor, the scaffolding for the selective integration of information, and is used to develop conceptual bridges. The concept of learning is built on these ideas. Learning is directed to bringing about changes and growth in people's knowledge, skills, attitudes and values. This learning takes place through continual exposure to information, and through classroom activities designed to foster the take-up and integration of this new information to some effect, generally measured through examination and continuous assessment. Learning assumes that knowledge is not static and changes in form and content, and this takes place over time.

However, there is only limited research available that addresses the question of the measurement and characterization of changes in people's knowledge structures, and the perceived effects of these changes. While a great range of research across many disciplines has been undertaken in many aspects of memory, cognition, text comprehension, and domains of knowledge, this work appears to be quite fragmented and disparate, and does not provide a cumulative body of knowledge about the dynamic nature of how knowledge grows and changes.

In the educational research on how knowledge changes, a number of common concepts have been developed including coherence, structural centrality, inferencing, and typicality. Studies of children by Chi and associates (Chi & Koeske, 1983; Gobbo & Chi, 1986; Chi, Hutchinson & Robin, 1989) focused on the way in which adolescents' knowledge structures about a specific topic differed according to whether they were novices or experts. The studies showed that as their knowledge became more detailed and comprehensive, their knowledge structures showed more local and global coherence, that is, they showed a clear hierarchical organization of concepts, as well as greater structural centrality, that is, concepts appeared to be more interrelated.

Little is known about how adolescents' knowledge changes when they are exposed to information about drugs. Given increasing levels of drug abuse, at a time when a plethora of information services exist to intervene in this problem, understanding information processes and the effects of information exposure are seen as critical to the development of information services that are more responsive to adolescents. In schools, this is an important role that can be provided by teacher-librarians. Teacher-librarians, in understanding how adolescents process drug information, may enable them to more effectively browse, connect with and interpret appropriate information relevant to the help and assistance they need. With clearer perception of how adolescents process this information, teacher-librarians may more effectively restructure and repackage information that is more closely targeted to their needs to ensure greater receptivity. In addition, such understanding can help teacher-librarians provide the resource and curriculum advice and guidance to teachers in the planning of teaching sequences related to drug curricula.

RESEARCH METHODOLOGY

Selection of Participants

Four girls aged 17 years were non-randomly selected to work with in-depth to gather thick data. They were in their final year of high school at a Catholic college in Sydney, Australia, and came from quite different cultural backgrounds. It is acknowledged that peering into the minds of people is difficult, and at a practical level, what exists in a person's mind is commonly externalized through verbalizations, either written or spoken. A key criterion in the selection of the girls was thus their high level of fluency in written and spoken English.

Design

A quasi-experimental approach was used to collect the data. It was felt that approaches such as case studies, questionnaires and naturalistic observation would not permit the in-depth, well controlled probe into the process of knowledge creation and change required, nor enable the perspectives of adolescents to stand out. The experiment consisted of two broad phases: the A phase involved baseline measures of the girls'

knowledge, and the B phase involved the introduction of staged exposures to information, and changes noted.

Environment and Focus of the Research

The research was placed within the context of the established school curriculum in New South Wales. The specific topic centered on the drug heroin, drawn from the module "Drug use and HIV/AIDS" in the subject "Personal Development, Health and Physical Education." This module aims to develop in students an awareness of the nature and incidence of drug use, an understanding of its impact on individual and community health, and application to personal behavior. A hypothetical task was provided to set realistic boundaries on the content. The task was a hypothetical presentation at a public forum focusing on the nature and incidence of the drug, implications for the individual, and implications for the community.

Procedures

The A phase and B phase of the data collection were implemented using the following plan, which included time for the girls to read, reflect, and take refreshment breaks:

(a) acquire and map base line knowledge structure of each girl
(b) first exposure to information
(c) acquire and map base knowledge structure after first exposure
(d) second exposure to information
(e) acquire and map base knowledge structure after second exposure
(f) third exposure to information
(g) acquire and map base knowledge structure after third exposure
(h) debriefing and discussion session.

Exposures to Information

The exposures to information were in the form of pre-determined amounts of different, publicly available print-based information about heroin, derived from three authoritative sources (Byrski, 1986; CEIDA, 1989; CEIDA, 1990). Each exposure dealt with a different aspect of heroin, and the order was determined through the pilot study involving a similar group of girls. The exposures were, in order (1) nature and history of heroin; (2) individual implications of heroin use; and (3) community implications, such as treatment and recovery.

Data Collection

The phases were repeated three times without varying the procedure. A combination of free generation written discourse and question answering protocols through a semi-structured interview was used to acquire the knowledge of the girls at each phase. These are common methods for exposing and analyzing the content of people's knowledge (Graesser & Clark, 1985). In the free generation stage, the girls wrote down all they knew about the drug heroin, in the context of the hypothetical task. Following this, their transcripts were examined to identify areas for probing in the interviews. In the question answering stage, the girls answered a set of how, when, where, why, and what questions to elaborate their written responses, providing greater richness to the data. This process took approximately five hours for each girl. The debriefing session focused on identifying the enabling effects of the exposures, as well as discussing their perceptions of the process. This provided a set of responses that collectively formed the knowledge of each girl prior to the information exposure, and after each exposure to information, as well as a set of statements related to effects of the exposures.

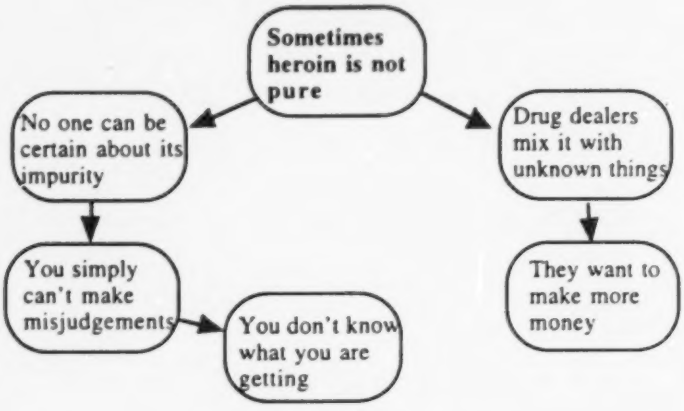
Data Analysis

In order to establish the changes to the girls' knowledge about heroin and the effects of the exposures, the acquired knowledge was combined and then mapped to create knowledge structures. The maps were in the form of Conceptual Graph Structures (Graesser & Clark, 1985). These graphical representations consisted of self-contained units called statement nodes interrelated by a network of

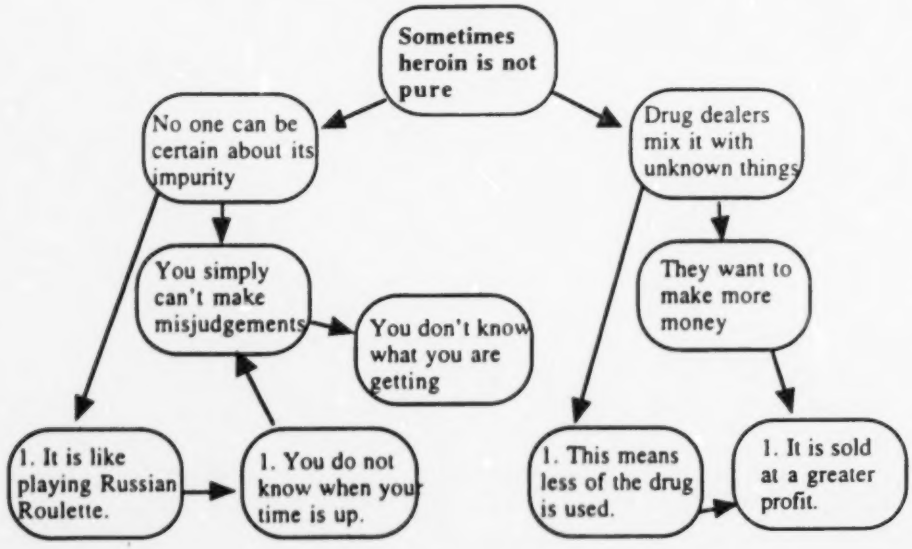
relational arcs. The unit of knowledge was a sentence that contained at least two concepts linked together expressed in the natural language of the girls.

The data were analyzed qualitatively. Using an inductive approach based on constant comparative method (Glaser & Strauss, 1967) the perceived effects of the information exposures were identified, and conceptualizations of these were developed. This was followed by identifying and conceptualizing the changes to the girls' knowledge structures, that is, alterations to the initial structures in some way. This involved constructing the conceptual graph structures for each stage and systematically comparing these structures across the different exposures, and isolating all instances of structural changes. Figure 1 illustrates a conceptual graph structure, as well as provides an example of a change in structure expressed by Girl #3. This change was associated with the stated effect: "I learned that the added ingredients posed greater danger. I didn't know this."

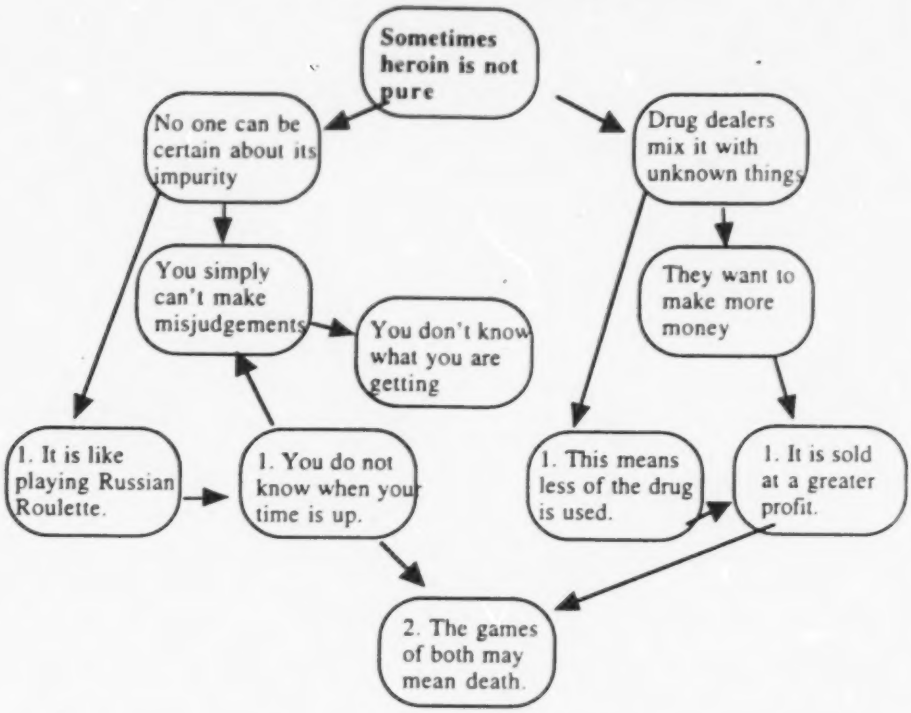
Initial Knowledge Structure


Sometimes heroin is not pure
No one can be certain about its impurity
Drug dealers mix it with unknown things
You simply can't make misjudgements
You don't know what you are getting
They want to make more money

After the First Exposure


Sometimes heroin is not pure
No one can be certain about its impurity
Drug dealers mix it with unknown things
You simply can't make misjudgements
You don't know what you are getting
They want to make more money
1. It is like playing Russian Roulette.
1. You do not know when your time is up.
1. This means less of the drug is used.
1. It is sold at a greater profit.

After the Second Exposure


Sometimes heroin is not pure
No one can be certain about its impurity
Drug dealers mix it with unknown things
You simply can't make misjudgements
You don't know what you are getting
They want to make more money
1. It is like playing Russian Roulette.
1. You do not know when your time is up.
1. This means less of the drug is used.
1. It is sold at a greater profit.
2. The games of both may mean death.

In this example, the initial knowledge structure contained two sets of nodes related to the purity of heroin. One focused on the role of the drug dealer, and the other on the heroin user. After the first exposure, these were developed further as separate structures. In the user-centered structure, nodes were inserted to explain why a misjudgment couldn't be made. In the drug dealer structure, a small goal-oriented structure was developed. After the second exposure, these two separate structures were linked together by the node "the games of both may mean death." This node was the culmination of both structures, based on "results in" relations.

FINDINGS

What did the girls do with the heroin information provided in the exposures? It was clearly evident that the information enabled them to do a number of things, and that their initial knowledge about heroin was changed. This is not surprising. Emerging out of the study however, were a distinctive pattern of effects that illustrated how and why they used the information, and some reasons for their selection and rejection of this information.

The Perceived Effects

The conceptualizing and labeling of the perceived effects were based on "picture," a term frequently used by the girls when describing the effects. Five effects of exposures to information were identified: (1) get a complete picture; (2) get a changed picture; (3) get a verified picture; (4) get a clearer picture; and (5) get a position in a picture.

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Get a complete picture. Get a complete picture was derived from indicators that collectively suggested the girls utilized the information to build an expanded, more complex picture about heroin. It appeared to take place in four ways. Firstly, general knowledge was expanded hierarchically with more specific detail and examples. Secondly, they built up an expanded picture by aggregating the various aspects of a topic into a complete picture. Thirdly, they made new connections between ideas that they didn't realize before. Fourthly, the new information helped them remember and recall ideas that already existed elsewhere in their minds that they hadn't thought of at the time. In essence, the information exposures enabled the girls to construct an expanded picture about heroin.

Get a complete picture was manifested in the revised knowledge structures that were shown to be more inclusive, elaborative, and integrative. A more inclusive knowledge structure resulted when they added specific instances, examples or types to more general statements, such as identifying a range of specific effects. The initial knowledge structure was changed from a general structure to a structure that showed greater specificity and precision of ideas through the hierarchical building of set membership. A more elaborative knowledge structure resulted when existing nodes were expanded by defining them, and/or describing their characteristics, processes, styles and causes. For example, existing knowledge was often expanded by providing static properties such as direction and quantity; by showing how an action occurred; by describing causes and consequences; and by elaborating goals, reasons, and outcomes. In a few cases, some of the revised knowledge structures showed the integration of separate substructures.

Get a changed picture. The girls utilized the information to make changes to their existing ideas. The information exposures enabled them to determine that existing ideas were incorrect or inappropriate and then remove them from the picture. In some instances, removing an incorrect idea was accompanied by replacing it with a new, correct idea.

The analysis showed that existing knowledge structures appeared to go through three stages of revision, conceptualized as "construction," "deconstruction" and "reconstruction." In order to get a changed picture, the girls built up a more detailed, descriptive picture by first appending inclusive and elaborative structures. This often enabled them to establish that some of their existing ideas were "wrong" or "not correct." This led to a stage conceptualized as "deconstruction." Here, the problematic ideas were removed by deleting. After deleting, the girls utilized the information to rebuild and/or further extend their pictures, a stage conceptualized as "reconstruction." The deleted node was often replaced by another node which in turn was the starting point for substantial appendings that extended the knowledge structure, resulting in other effects, such as get a complete picture and get a position in a picture.

Get a clearer picture. All the girls made use of the information to get a clearer picture. In these instances, they perceived that the information shed more light on their ideas so that the ideas could be seen more clearly, with greater understanding and clarity; and that the exposures enabled them to sort out, organize and sequence ideas more meaningfully. In other instances the information enabled them to resolve confusions and indistinctions.

Two types of revised knowledge structures were evident. Firstly, the girls consistently inserted nodes to tell "how" or "why" their ideas were related. These explanations added greater clarity and understanding to their ideas. In some cases, they constructed knowledge structures that showed precision and specificity of ideas through building up set membership details or specific property/attribute details.

Get a verified picture. The conversations with the girls made it apparent that they were able to utilize the information to verify existing ideas, especially where some doubt existed in their minds about their certainty, and even though on the surface the ideas appeared stated as certain. In doing so, this enabled them to remove doubt about, or establish with more surety, an existing idea. This effect was labeled get a *verified picture.*

Four types of revised knowledge structures were associated with this effect. These were labeled: no change, emphatic change, inclusive change, and defensive change. In some cases, a perceived effect was not associated with any change to knowledge structures. One possible explanation for this might be that initially

they were guessing, and these guesses were expressed tentatively as fact, and there was no basis for identifying this distinction. In a number of knowledge structures, there was repetition of nodes which appeared to be used to add weight or emphasis to a particular statement, primarily personal statements, for example, repeating the idea that the most effective approach to dealing with the problem of drug addiction was through drug education. In a few instances, verification was shown through appending more precise, specific ideas. Likewise, a change of facts encouraged the girls to defend and reaffirm a viewpoint based on the facts before they were changed in their knowledge structures. Overall, get a *verified picture* was seen as a continuum: sometimes it meant moving from doubt to certainty; sometimes it helped to confirm existing knowledge; and sometimes it strengthened their belief in their existing position or knowledge.

Get a position in a picture. The girls indicated that the information in the exposures helped them to develop and express an opinion about the pictures they had built up, to state their view, to derive conclusions, and to make predictions and reflections based on facts.

The changed knowledge structures associated with this effect were conceptualized as: reactive; formative; predictive; and potential positioning. In reactive knowledge structures, position statements were appended that expressed a reaction, generally by agreeing or disagreeing with some of the ideas that they had incorporated into their structures. Some of the revised knowledge structures of the girls showed a formative change. This was where they formed a personal conclusion based on the facts provided in the exposure. In a few cases, the revised knowledge structures provided no evidence of a statement of a position associated with the effect. Here they tended to acknowledge the potential to be able to use the set of facts at some future time to construct a case or an argument or to present a viewpoint.

In processing the information in the exposures, the girls got expanded, or changed, or clearer or verified pictures, or were able to state positions. Their knowledge was not static; rather, it evolved, and it evolved differentially for each girl. They selected information for specific purposes, to meet particular cognitive needs. While an overall pattern seemed to be get a complete picture -> get a changed picture -> get a clearer picture -> get a position in a picture, this was not necessarily a consistent depiction of how the girls processed the information. At any one time, some information in an exposure was helping to get a complete picture; other information from that exposure was creating a changed picture elsewhere in their knowledge base; and other information was helping to develop a position statement.

Selection of Information

The girls were highly deliberate and selective in what information they chose to absorb and to reject. They were not passive vessels into which information could be poured, and then absorbed in toto. A number of factors contributed to this. Their personal encounters and experiences with the ideas and people associated with heroin provided ways of identifying related information and hooks for linking new information. For example, all the girls picked up on the information about Coleridge using opium, whereas they did not select information about a number of other people mentioned. They made it clear that they were currently studying the life and poetry of Coleridge in their English classes, and had not been aware of Coleridge's association with heroin. In doing so, the information helped to make connections to, and elaborate, other existing knowledge structures.

All the girls selected information about the effect of heroin on driving, while ignoring other significant effects. Discussions indicated that this was important because they were at the age of acquiring learner driver permits, undertaking driving lessons, or obtaining provisional driving licenses. Similarly, all girls incorporated information about the effect of heroin on pregnancy. One girl explained "this is something I will be thinking about in the near future—you know, getting married and having kids." Their interest here seemed to coincide with their life cycle—a time when young women are dating and beginning to making decisions about relationships, marriage, and child raising. Immediacy in terms of aspects of their own age and life cycle appears to have played an important part in the selection process.

Personal interest provided a strong basis for selecting and rejecting information. One girl said that she was only interested in Australian history, and paid little attention to the historical origins of heroin, commenting: "The early history doesn't interest me. I didn't take much interest because it is still too remote

from me. I can remember quickly reading over the information on the Greeks and Romans, but didn't take any in. I looked quickly over the information until I found something I could relate too, like the use of the drug in Australia."

Overall for these girls, the selection of information appeared to be based on perceptions of personal relevance, interest or influence derived from their personal goals, their learning context, current stage of life cycle, and/or current state of knowledge. What was also evident was that the same information had different effects for different girls. For one girl, the information about Coleridge enabled her to get a complete picture about the history of heroin; for another, it enabled her to get a position in a picture about the effect of the drug on people's creativity; and for another, it gave greater strength to her view of Coleridge as a creative poet. The process of utilizing information, the process of constructing knowledge and the process of utilizing that which is constructed were individual processes, shaped by existing pictures and person-in-context.

Existing knowledge also shaped what the girls chose to accept. This was an important basis for information gathering. Each girl's initial knowledge was markedly different, and even though they were all exposed to the same information, and in the same order, the revised knowledge structures were also markedly different. It cannot be assumed that because all students are learning a specific topic and require information on it, that their knowledge is the same, and that they will process information in the same way. The evolution of a person's body of knowledge about a particular topic is not a random acquisition of information, but is a directed and purposeful process toward making personal sense. It is not the mental transfer of stable blocks of facts from an external source to an internal source, rather, it is a processual interaction which constructs and produces effects; it is a making and a remaking, a destroying and a rebuilding. Information acquisition is purposeful, transformative rather than merely additive. The girls did not grab ideas and attach them anywhere for the sake of knowing more. They manipulated and modified their existing knowledge to enable the inclusion and integration of new information in meaningful ways by making adjustments such as reorganizing, repositioning, and regrouping ideas. They also made alterations when faced with conflicting information. They used the information to make personal sense, to move on in their understanding.

IMPLICATIONS FOR TEACHER-LIBRARIANS

Collection Development

Specific facts seemed to have been important to the girls in constructing their revised knowledge structures, and these facts played different roles at different times in the utilization process. The immediate implication is to swamp adolescents with facts. School libraries tend to be fact oriented, characteristically providing factual information that is authoritative, accurate, and recent, in essence, socially sanctioned information that doesn't encourage adolescents to take drugs. However, this is not necessarily the information that adolescents require. They want more than facts when accessing information. They want to confirm doubts, establish certainty of ideas, and test their belief in particular ideas. They want to form opinions, develop conclusions. They want to know of the experiences, viewpoints and different perspectives of people, including drug users, so that they can make connections and make decisions. Adolescents should not be immediately swamped with facts, in the hope that the provision of the specific facts might provide the needed pictures or cognitive effects. Rather, the implication is the need for teacher-librarians to focus on the desired cognitive effect, the sense and meaning that adolescents want to create for themselves through accessing information, and to understand how this effect is best met for each person, and to have available the appropriate information, factual or otherwise required by the individual to achieve the desired effect.

Too often presenting the facts conveys the idea that simply making the information available to adolescents will convert their existing drug problems into non-problems, that without any special effort on behalf of adolescents, truth and positive action will prevail. The study shows that no matter how compelling, or authoritative information might be in the minds of others, no matter how useful someone else might think the information is, these qualities do not guarantee its receptivity and utilization.

Collections related to drug information need to be responsive to the kinds of help that adolescents want about drugs. An appropriate collection might reflect a mix of factual information, information tailored to specific aspects of the life cycle of adolescents and targeted to specific age groups, resources that provide personal accounts and stories of drug users, multiple perspectives and interpretations on drugs, that help adolescents build arguments, viewpoints, and make decisions. The collection also needs to include resources that reflect the perspective of adolescents themselves, even resources written by adolescents. This may mean a refocus in the provision of content from the transmission of a mass of facts considered "true," to a more careful, perhaps limited selection of content based on understanding the kinds of helps, utilities, or cognitive utilization's that students are seeking.

More specifically, the study suggests that selecting sources of information to match more closely where adolescents are at in their personal and social experiences and physiological development may mean that it is utilized more effectively and integrated more meaningfully into their existing knowledge. Targeting the provision of information to specific aspects of the immediate contexts and life stages of groups of people, rather than trying to cover all circumstances of large heterogeneous groups, may be a more productive step forward.

Access to Information

The findings provide an approach to making electronic information retrieval more effective in meeting the drug information needs of adolescents. Electronic database systems are designed to be accessed through a range of document descriptors, such as subject headings, author's name, type of publication, and date—all related to accessing facts. However, the types of helps identified in this study provide an approach for allowing a person to enter the system, not just in terms of the content or document description, but also from the perspective of the cognitive effects or helps that they might seek, such as: wanting facts, opinions and viewpoints, details, arguments, explanations, identifying misconceptions. For example, a user might desire to locate information about heroin that provides explanations (get a clearer picture), or position statements (get a position in a picture) or facts that elaborates their current understanding (get a complete picture). They may be able to profile their current level of knowledge in some way, and then link to documents which elaborate, or explain, or provide position statements as required by the person. This kind of access could contribute to enhanced browsing, connecting, interpreting, and more effective resource selection matched to need.

Dialogue with Adolescents

Teacher-librarians have an important role to play in the information exchange process. All too often the dialogue between student and teacher-librarian focuses on identifying content and extent of catalogue use, and then matching content to specific sources. Traditionally, the questioning approach has revolved around subjects, authors, keywords, titles and formats.

This study suggests a new way of looking at the form of dialogue. This approach gives attention to understanding the kinds of cognitive effects desired, for example, explanations about how and why, or a range of viewpoints or perspectives about a particular topic, or confirming a particular aspect. In other words, the dialogue would take a constructivist stance, seeking to ascertain how people want to move on cognitively from where they are at with a particular content area, and seeking to establish the connections and links already existing between ideas. The outcome for the teacher-librarian would be a sharper understanding of the needs of adolescents from the adolescent's perspective. This could play an important role in preventing premature diagnosis of the information need, as well as ensuring greater user satisfaction.

Kuhlthau (1989), in her extensive studies of the information search process of school students, has highlighted both the active sense-making role of individuals in finding meaning that fits with existing knowledge. A significant finding by Kuhlthau in relation to the early stages of the search process was school students' low level of confidence with information seeking. This underscores the importance of the nature of intervention or mediation by teacher-librarians when students embark on information seeking activities. Providing this intervention in terms of ascertaining the kind of cognitive helps the students are looking for could help them develop more meaningful searching and outcomes-related goals. Focusing on

desired cognitive pictures in the dialogue may also help reduce the uncertainty and its affective symptoms of anxiety and lack of confidence.

Instructional Design

As an extension of the above ideas, the findings of this study have implications for teachers and teacher-librarians in designing classroom instruction. Understanding the types of information utilization that take place shifts the focus of learning from the content and finding the right answer to the question, to the process of learning, and particularly to understanding where individuals are at with their learning process. By understanding how cognitive change happens in relation to the stream of information that is provided to students, teachers can create opportunities for more meaningful use of information by adolescents by explicitly designing learning activities that facilitate the development of different types of pictures.

This has implications for the nature of the classroom environment. It suggests more active process-oriented and cognitive effects-oriented questioning; more opportunities for students to reflect on their learning process; shaping of learning goals in terms of cognitive effects; and greater emphasis on evaluating the process of learning, rather than on making judgments about the mastery of content and the regurgitation of facts. It may also help teachers set more appropriate goals in learning, by identifying and making explicit the kinds of pictures they want to create in class.

This is what information literacy is all about. In the school environment, information literacy is fostered through the development of a range of intellectual skills centering on: defining the tasks for which information is needed; locating appropriate sources of information; making judgments about, selecting and recording relevant information; understanding and appreciating this information and being able to combine and organize it for best application; presenting the information learned in an appropriate way; and evaluating the outcomes in terms of task requirements and increases in knowledge.

CONCLUSION

Teacher-librarians have a major responsibility in understanding how adolescents they work with cognitively process information. The provision of effective information services to support their learning and to help them with their life concerns rests upon this. This kind of service is individual, flexible, and situated in the context of the real world of adolescents. It acknowledges that adolescents are selective and constructive in their use of information, that their information needs and their information goals vary. Enhancing their access to drug information through a tailored collection, improved database access, more effective instructional design and quality dialogue may well mean a greater quality of life for these adolescents, if not a question of life and death.

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